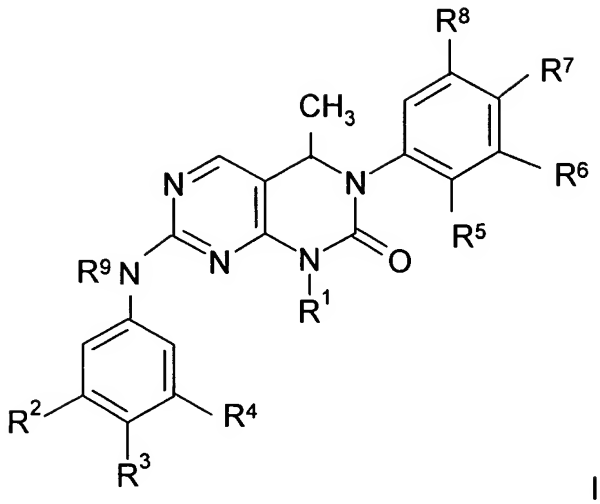
CLAIMS

What is Claimed is:

1. A compound of formula:



I,

or a pharmaceutically acceptable salt thereof, wherein

R^1 is selected from the group

H,

$C_{1\text{-}10}$ alkyl,

$C_{1\text{-}10}$ alkyl substituted by up to three groups selected from aryl, cycloalkyl, heteroaryl, heterocycle, $NR^{10}R^{11}$, OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2, wherein the aryl, cycloalkyl, heteroaryl, and heterocycle groups may each independently be substituted by up to three groups selected from $NR^{10}R^{11}$, OR^{12}, SR^{12}, , halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

aryl,

aryl substituted by up to three groups selected from lower alkyl, $NR^{10}R^{11}$, OR^{12}, SR^{12}, , halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

heteroaryl,

heteroaryl substituted by up to three groups selected from lower alkyl, $NR^{10}R^{11}$, , OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

heterocycle,

heterocycle substituted by up to three groups selected from lower alkyl, $NR^{10}R^{11}$, OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

C_{3-10} cycloalkyl,

C_{3-10} cycloalkyl substituted by up to three groups selected from lower alkyl $NR^{10}R^{11}$, OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

C_{2-10} alkenyl,

C_{2-10} alkenyl substituted by up to three groups selected from $NR^{10}R^{11}$, OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2, and

C_{2-10} alkynyl, substituted by up to three groups selected from $NR^{10}R^{11}$, OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2;

R^2, R^3 and R^4 are independently selected from the group consisting of

H,

$NR^{10}R^{11}$,

OR^{12},

SR^{12},

C_{1-10} alkyl,

C_{1-10} alkyl substituted by up to three groups selected from cycloalkyl, heteroaryl, heterocycle, $NR^{10}R^{11}$, OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2; and wherein the cycloalkyl, heteroaryl, and heterocycle groups may each independently be substituted by up to three groups selected from lower alkyl, $NR^{10}R^{11}$, OR^{12}, SR^{12},

halogen, COR^{113}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

heteroaryl, heteroaryl substituted by up to three groups selected from lower alkyl, $NR^{10}R^{11}$, OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

heterocycle, substituted by up to three groups selected from lower alkyl, $NR^{10}R^{11}$, OR^{12}, SR^{12} , halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

C_{3-10} cycloalkyl,

C_{3-10} cycloalkyl substituted by up to three groups selected from lower alkyl, $NR^{10}R^{11}$, OR^{12}, SR^{12} , halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

C_{2-10} alkenyl,

C_{2-10} alkenyl substituted by up to three groups selected from $NR^{10}R^{11}$, OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

C_{2-10} alkynyl, and

C_{2-10} alkynyl substituted by up to three groups selected from $NR^{10}R^{11}$, OR^{12}, SR^{12}, halogen, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, $SO_2NR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, CN and NO_2,

Provided that at least one of R^2, R^3 or R^4 is not H.

R^5, R^6, R^7 and R^8 are independently selected from the group

H,

lower alkyl,

lower alkyl substituted by hydroxy or alkoxy,

$NR^{15}R^{16}$,

OH,

OR^{17},

SR^{17},

halogen,

COR^{17},

CO_2R^{17},

$CONR^{17}R^{18}$,

$SO_2NR^{17}R^{18}$,

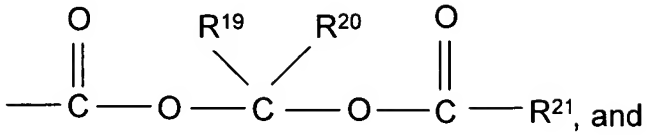
SOR^{17},

SO_2R^{17}, and

CN;

R^9 is selected from the group

H,



, and

COR^{17};

R^{10} and R^{11} are independently selected from the group

H,

COR^{13},

CO_2R^{13},

$CONR^{13}R^{14}$,

SO_2R^{13},

$SO_2NR^{13}R^{14}$,

lower alkyl,

lower alkyl substituted by hydroxy, alkoxy or $NR^{15}R^{16}$,

cycloalkyl,

cycloalkyl substituted by hydroxy, alkoxy, lower alkyl, or $NR^{15}R^{16}$,

heterocycle, and

heterocycle substituted by hydroxy, alkoxy, lower alkyl, or $NR^{15}R^{16}$,

or, alternatively, $NR^{10}R^{11}$ can form a ring having 3 to 7 atoms, said ring optionally including one or more additional hetero atoms and being optionally substituted by the group consisting of one or more lower alkyl, OR^{12}, COR^{13}, CO_2R^{13}, $CONR^{13}R^{14}$, SOR^{13}, SO_2R^{13}, and $SO_2NR^{13}R^{14}$;

R^{12} is selected from the group

H,
lower alkyl,
COR^{13},
$CONR^{13}R^{14}$,
C_{2-6} alkyl substituted by hydroxy, alkoxy, or $NR^{15}R^{16}$, cycloalkyl,
cycloakyl substituted by hydroxy, alkoxy, lower alkyl, or $NR^{15}R^{16}$,
heterocycle, and
heterocycle substituted by hydroxy, alkoxy, lower alkyl, or $NR^{15}R^{16}$;

R^{13} and R^{14} are independently selected from the group

H,
lower alkyl,
C_{2-6} alkyl substituted by hydroxy, alkoxy, or $NR^{15}R^{16}$,
cycloalkyl,
cycloaklyl substituted by hydroxy, alkoxy, lower alkyl, or $NR^{15}R^{16}$,
heterocycle, and
heterocycle substituted by hydroxy, alkoxy, lower alkyl, or $NR^{15}R^{16}$,

or , alternatively, $NR^{13}R^{14}$ can form a ring having 3 to 7 atoms, said ring optionally including one or more additional hetero atoms and being optionally substituted by the group consisting of one or more lower alkyl, OR^{17}, COR^{17}, CO_2R^{17}, $CONR^{17}R^{18}$, SO_2R^{17}, and $SO_2NR^{17}R^{18}$;

R^{15} is selected from the group

H,

lower alkyl,
COR^{17}, and
CO_2R^{17}; and

R^{16}, R^{17} and R^{18} are independently selected from the group
H, and
lower alkyl,

or, alternatively, $NR^{15}R^{16}$ and $NR^{17}R^{18}$ can each independently form a ring having 3 to 7 atoms, said ring optionally including one or more additional hetero atoms;

R^{19} and R^{20} are independently selected from the group
H, and
lower alkyl; and

R^{21} is selected from
lower alkyl, and
C_{2-6} alkyl substituted by hydroxy, alkoxy or $NR^{15}R^{16}$,

or a pharmaceutically acceptable salt thereof.

2. The compound of claim 1 wherein R^1 is selected from aryl and aryl substituted by CN and $CONR^{13}R^{14}$.

3. The compound of claim 1 wherein R^1 is selected from lower alkyl.

4. The compound of claim 2 wherein R^2 is C_{1-10} alkyl substituted by OR^{12} or $NR^{10}R^{11}$.

5. The compound of claim 3 wherein R^2 is OR^{12}.

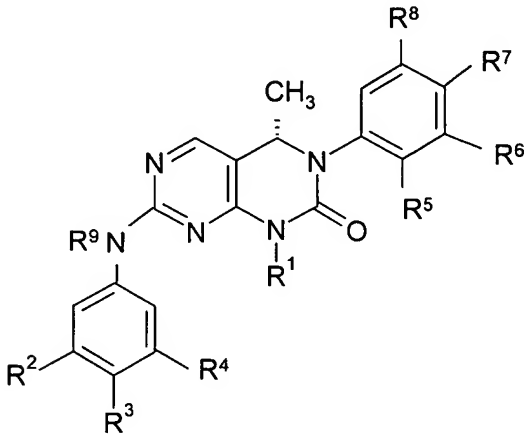
6. The compound of claim 1 wherein R^3 is H.

7. The compound of claim 1 wherein R^3 and R^4 are H.

8. The compound of claim 1 wherein R^4 is $C_{1\text{-}10}$ alkyl substituted by $NR^{10}R^{11}$.

9. The compound of claim 1 wherein R^5 is halogen.

10. The compound of claim 1 having the formula



Ia.

11. A compound selected from the group:

(±)-3-[7-[3-(2-Hydroxy-ethyl)-phenylamino]-3-(4-methoxy-phenyl)-4-methyl-2-oxo-3,4-dihydro-2H-pyrimido[4,5-d]pyrimidin-1-yl]-benzonitrile ;

(±)-3-[7-[3-(2-Diethylamino-ethyl)-phenylamino]-3-(4-methoxy-phenyl)-4-methyl-2-oxo-3,4-dihydro-2H-pyrimido[4,5-d]pyrimidin-1-yl]-benzonitrile ; and

(±)-3-[7-[3-(2-Dimethylamino-ethyl)-phenylamino]-3-(4-methoxy-phenyl)-4-methyl-2-oxo-3,4-dihydro-2H-pyrimido[4,5-d]pyrimidin-1-yl]-benzonitrile .

12. A compound selected from the group:

(±)-3-(3-(4-Methoxy-phenyl)-4-methyl-7-{3-[2-(4-methyl-piperazin-1-yl)-ethyl]-phenylamino}-2-oxo-3,4-dihydro-2H-pyrimido[4,5-d]pyrimidin-1-yl)-benzonitrile ;

(±)-3-[7-[3-(2-Diethylamino-ethyl)-phenylamino]-3-(4-methoxy-phenyl)-4-methyl-2-oxo-3,4-dihydro-2H-pyrimido[4,5-d]pyrimidin-1-yl]-benzamide ;

(±)-3-[7-[3-(2-Dimethylamino-ethyl)-phenylamino]-3-(4-methoxy-phenyl)-4-methyl-2-oxo-3,4-dihydro-2H-pyrimido[4,5-d]pyrimidin-1-yl]-benzamide ; and

(±)-3-(3-(4-Methoxy-phenyl)-4-methyl-7-{3-[2-(4-methyl-piperazin-1-yl)-ethyl]-phenylamino}-2-oxo-3,4-dihydro-2H-pyrimido[4,5-d]pyrimidin-1-yl)-benzamide .

13. The compound

(+)-3-(2-Bromo-phenyl)-7-[4-(2-diethylamino-ethoxy)-phenylamino]-1,4-dimethyl-3,4-dihydro-1H-pyrimido[4,5-d]pyrimidin-2-one.

14. The compound

(-)-3-(2-Bromo-phenyl)-7-[4-(2-diethylamino-ethoxy)-phenylamino]-1,4-dimethyl-3,4-dihydro-1H-pyrimido[4,5-d]pyrimidin-2-one.

15. The compound

(±)-3-(2-Bromo-phenyl)-7-[4-(2-diethylamino-ethoxy)-phenylamino]-1,4-dimethyl-3,4-dihydro-1H-pyrimido[4,5-d]pyrimidin-2-one.

16. A pharmaceutical composition comprising a therapeutically effective amount of a compound of claim 1 and pharmaceutically acceptable carrier or excipient.

17. A method for treating cancer comprising administering to a patient in need of such treatment a therapeutically effective amount of a compound of claim 1.

18. A method of controlling cancer comprising administering to a patient in need of such treatment a therapeutically effective amount of a compound of claim 1.

19. The method of claim 17 wherein the cancer is breast, colon or hepatic cancer.

20. The method of claim 18 wherein the cancer is breast or colon cancer.

21. A compound selected from the group:

(±)-Acetic acid 2-{3-[8-(3-cyano-phenyl)-6-(4-methoxy-phenyl)-5-methyl-7-oxo-5,6,7,8-tetrahydro-pyrimido[4,5-d]pyrimidin-2-ylamino]-phenyl}-ethyl ester and

(±)-Methanesulfonic acid (2-{3-[8-(3-cyano-phenyl)-6-(4-methoxy-phenyl)-5-methyl-7-oxo-5,6,7,8-tetrahydro-pyrimido[4,5-d]pyrimidin-2-ylamino]-phenyl}-ethyl)-ester,